

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

216735US2PCT

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

10/009774

INTERNATIONAL APPLICATION NO
PCT/FR99/01467INTERNATIONAL FILING DATE
17 June 1999PRIORITY DATE CLAIMED
none

TITLE OF INVENTION

TICKET PRINTING DEVICE, IN PARTICULAR TRANSPORT TICKETS, OF DIFFERENT FORMATS

APPLICANT(S) FOR DO/EO/US

GLIZE Jean-Pierre

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau)
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau)
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made, however, the time limit for making such amendments has NOT expired
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3))
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4))
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5))
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409)
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment
17. ☐ A substitute specification
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4)
22. ☐ Certificate of Mailing by Express Mail
23. ☒ Other items or information

Drawings (8 sheets)

PCT/IB/308

Form PTO-1449

U.S. APPLICATION NO. 10/009774 <small>(IF KNOWN, USE 37 CFR 1.53)</small>		INTERNATIONAL APPLICATION NO. PCT/FR99/01467		ATTORNEY'S DOCKET NUMBER 216735US2PCT	
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24. The following fees are submitted. BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
				\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				\$130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	11 - 20 =	0	x \$18.00	\$0.00	
Independent claims	1 - 3 =	0	x \$84.00	\$0.00	
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$1,020.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2				\$0.00	
SUBTOTAL =				\$1,020.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				\$0.00	
TOTAL NATIONAL FEE =				\$1,020.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)) The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$1,020.00	
				Amount to be: refunded	\$
				charged	\$

a. ☒ A check in the amount of \$1,020.00 to cover the above fees is enclosed.


b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees
A duplicate copy of this sheet is enclosed

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0030 A duplicate copy of this sheet is enclosed

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO.



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Surinder Sachar

SIGNATURE _____

Marvin J. Spivak

NAME _____

24,913

REGISTRATION NUMBER _____

Dec. 17 2001

DATE _____

JC07 Rec'd PCT/PTO 1 7 DEC 2001

10/009774

216735US2-PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :
JEAN-PIERRE GLIZE : ATTN: APPLICATION DIVISION
SERIAL NO: NEW U.S. PCT APPLICATION :
(Based on PCT/FR99/01467)
FILED: HEREWITH : EXAMINER:
FOR: TICKET PRINTING DEVICE, :
IN PARTICULAR TRANSPORT
TICKETS, OF DIFFERENT FORMATS

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified application as follows:

IN THE CLAIMS

Please cancel Claims 1-11 without prejudice.

Please add new Claims 12-22 as follows:

12. (New) Ticket printing device, comprising:

at least one thermal print head,

driving means arranged to move a ticket across the print head, presenting a first principal face of the ticket to the print head, and

means of guidance capable of imparting a direction of travel to the ticket,

wherein said driving means includes a block applied against a second face of the ticket, opposite to the first principal face, and including a first powered rotating roller capable

of causing the ticket to move, and a second idling roller, extending beyond the powered roller, which is used to drive tickets of different widths in the direction of travel.

13. (New) Device according to claim 12, wherein the powered roller and the idling roller are respectively generally cylindrical in shape, substantially co-axial, and similar in radius, and the powered roller and the idling roller are substantially juxtaposed.

14. (New) Device according to claim 12, wherein the guidance means includes, facing the powered roller, at least one wall parallel to an edge of the ticket, forming a tab capable of defining the direction of travel of the ticket, while the block forms a chosen angle with said direction of travel.

15. (New) Device according to claim 14, wherein the guidance means includes, along the direction of travel, an upstream tab and a downstream tab, substantially juxtaposed and placed on either side of the powered roller.

16. (New) Device according to claim 14, wherein the block forms, in a direction from the powered roller towards the print head, an angle of between 89° and 90° , preferably in the region of 89.7°

17. (New) Device according to claim 12, wherein the thermal print head includes a plurality of resistance heating elements capable of releasing heat to enable printing of the ticket, and the device further comprising means to electrically test the plurality of resistance elements, one by one, said testing means utilizing an addressing module for the plurality of resistance elements.

18. (New) Device according to claim 12, further comprising means of supporting the print head including a flexible plate fixed, on one hand, to the print head and, on the other hand, to a mounting integral with the block, together with a rigid plate fixed to the print head and equipped with an end bar substantially parallel to the direction of travel and seated so as to rotate about an axis substantially parallel to the direction of travel in an aperture

incorporated into the mounting, such that said rigid plate is capable of preventing pitching motion of the print head while at the same time allowing a rolling motion about said axis.

19. (New) Device according to claim 18, further comprising means of pushing the plate against the block, the print head being in a position facing the block.

20. (New) Device according to claim 19, wherein the pushing means includes an electro-magnet actuated electrically.

21. (New) Device according to claim 12, wherein the thermal print head is capable of printing barcodes on a ticket.

22. (New) Device according to claim 21, wherein the ticket includes magnetic information, and the device further comprises a magnetic recording head, while the print head is arranged to operate in conjunction with the magnetic recording station to print barcodes matching the magnetic information recorded on the ticket.

IN THE ABSTRACT OF THE DISCLOSURE

Please add the following new Abstract on a separate sheet:

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ABSTRACT

A ticket printing device, provided with a thermal printing head and a powered block, between which a ticket moves along. The block is segmented into a power-drive part and an idling part, for driving tickets of different widths. For tickets with a width approximately the same as the length of the power-drive part, the idling part is immobilized against the printing head. For tickets with a width approximately the same as the entire length of the block, the idling part is driven in rotation by the displacement of the ticket. The ticket printing device is particularly useful for printing transport tickets with magnetic stripes.

REMARKS

Favorable consideration of this application, as presently amended, is respectfully requested.

The present preliminary amendment is submitted to place the above-identified application in more proper format under United States practice.

By the present preliminary amendment original Claims 1-11 are cancelled and new Claims 12-22 are presented for examination. New Claims 12-22 are deemed to be self-evident from the original disclosure, including original Claims 1-11, and thus are not deemed to raise any issues of new matter. Further, any differences between new Claims 12-22 and original Claims 1-11 are believed to at most broaden the scope of new Claims 1-11.

An Abstract is also submitted herein.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

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216735US2-PCT

Marked-Up Copy

Serial No: _____

Amendment Filed on: _____

12-17-01

IN THE CLAIMS

Claims 1-11 (Cancelled).

Claims 12-22 (New).

IN THE ABSTRACT OF THE DISCLOSURE

Abstract (New).

Ticket printing device, in particular transport tickets, of different formats.

5 The invention relates to the field of ticket printing, such as transport tickets, from a thermal type print head.

10 A device for printing of this type is normally equipped with means of driving the tickets capable of causing the ticket to move across the print head, presenting a principal face of the ticket to the head.

15 In Patents FR 88 00734 and FR 88 00733, the Applicant described a ticket printing device equipped with a thermal print head and means of driving the tickets including a block formed from a powered rotating roller, and applied against a face of the ticket, opposite the face presented to the print head. The device also includes means of guidance which define a direction of travel of the ticket under the print head. The block is substantially perpendicular to the direction of travel of the ticket such that the roller, in rotation, exerts a tangential force on the ticket to cause it to move under the print head.

20 Such a device was found to be effective for the printing of identical tickets, particularly of the same width (viewed in a direction perpendicular to the direction of travel).

25 However, the Applicant was faced with the problem of providing a printing device capable of operating on tickets of different formats, in particular of different widths.

30 The present invention provides a solution to this problem.

It relates to a printing device including :

- at least one thermal print head,

- driving means arranged to move the ticket across the print head, presenting a first principal face of the ticket to the print head, and
- means of guidance capable of imparting a direction of travel to the ticket.

According to a general characteristic of the invention, the driving means include a block applied against a second face of the ticket, opposite to the first principal face, and including a first powered rotating roller capable of causing the ticket to move, and a second idling roller, extending beyond the powered roller, which is used to drive tickets of different widths in the direction of travel.

Thus, it is no longer necessary, in a device according to the invention, to motorise the entirety of the block. Provision may therefore be made for a motor of sufficient capacity to drive the powered roller only.

Preferably, the powered roller and the idling roller are respectively generally cylindrical in shape, substantially co-axial and similar in radius. In addition, the motorised roller and the idling roller are substantially juxtaposed.

Advantageously, the guidance means include, with regard to the motorised roller, at least one wall parallel to an edge of the ticket, forming a tab capable of defining the direction of travel of the ticket, while the block forms a chosen angle with said direction of travel.

Preferably, the guidance means include, along the direction of travel, an upstream tab and a downstream tab, substantially juxtaposed and placed on either side of the powered roller.

According to another advantageous optional characteristic, the block forms, in the direction from the powered roller towards the idling roller, with a direction of movement of the ticket towards the print head, an angle of between 89° and 90° , preferably in the region of 89.7° .

Advantageously, the thermal print head includes a plurality of heating elements capable of releasing heat to enable printing of the ticket, while the device includes means to electrically test the elements, one by one, these testing means utilising a heating element addressing module customarily used for thermal printing.

According to another advantageous optional characteristic of the device according to the invention, provision is made for means of supporting the print head including a flexible plate fixed, on one hand, to the print head and, on the other hand, to a mounting integral with the block, together with a rigid plate fixed to the print head and equipped with an end bar substantially parallel to the direction of travel and seated so as to rotate about an axis substantially parallel to this direction of travel in an aperture incorporated into said mounting. Thus, this rigid plate is capable of preventing pitching motion of the print head whilst at the same time allowing a rolling motion about the axis of rotation of the bar.

Advantageously, provision is also made for means of pushing the plate against the block, the print head being in a position facing the block.

Other characteristics and advantages of the invention will become apparent upon examination of the detailed description below and the attached diagrams in which :

- figure 1 is a general view of a printing device according to the invention;
- figure 2A illustrates a print station 'TT' of the device shown in figure 1, viewed from the right;
- figure 2B illustrates the station 'TT' shown in figure 2A, viewed from the front;
- figure 2C illustrates the station 'TT' shown in figure 2A, viewed in perspective from the right;
- figure 2D illustrates the station 'TT' shown in figure 2A, viewed from the left;

- figure 3 illustrates the relative arrangement of a block, a tab and a print head of the station shown in figure 2;
- figure 4 illustrates an exploded-view of the support elements of the print head; and
- 5 - figure 5 gives a schematic representation of the means of testing the operation of the heating elements incorporated in the print head.

The detailed description below and the attached diagrams contain, for the most part, elements of certain character. They may therefore serve not only to facilitate a better understanding of the invention, but also contribute to its definition, if required.

A description is given below, by way of non-limitative example, of the printing of tickets carrying magnetic information.

Reference will first be made to figure 1 to describe a ticket printing device, for transport tickets in the example described, said tickets including a magnetic stripe carrying information.

For example, the processing device is that described in the Patent Application filed by the Applicant on the same day as the present Application, and entitled "Ticket processing device with thermal printing and magnetic recording/reading on an internal path in closed circuit". For all necessary purposes, the description of this Application forms an integral part of the detailed description below.

The printing device DIS makes use, in the example described, of a three-way feed of ticket strips arranged fan-fold. Three storage magazines (not shown) each containing a continuous stock of tickets in strips separated by means of lines of weakening (pre-perforated strips) can thus feed a ticket printing device according to the invention.

Strips of tickets are introduced, at the station PIN, via three guide channels CA1, CA2 and CA3 which converge towards each other and are fitted with separate driving means, in this case composed of rollers and backing rollers 1, 3 and 5. The ticket strips are then moved in the direction of the arrow F1 across a magnetic record/read head PIL including a first magnetic recording head TM1, followed by a second magnetic reading head TM2. As a variant, the magnetic record/read head PIL may only include a single magnetic head. In this case, the strip passes across the single magnetic head several times.

The driving means are then arranged to move a ticket along an internal bidirectional path F1 and F2, leading from the feed station to the delivery station DEL via the magnetic record/read head.

It will be noted that, in the example described, the entry to channel CA1 is defined by two rollers 7 and 9 which are mounted freely to avoid any friction between any fixed parts and the moving strip. The entry to feed channel CA2 is defined by rollers 9 and 11, while the entry to feed channel CA3 is defined by rollers 11 and 13. Thus, at point 2 in figure 1, the three feed channels CA1, CA2 and CA3 converge, thus bringing the strip of tickets to point 2.

In practice, the driving means include a belt C1 wound onto a roller 4, and also onto the roller 6 via the heads TM1 and TM2, and is wound onto rollers 8 and 10 to continue the internal path. The belt C1 is driven in closed circuit by means of a drive roller 12 integral with the shaft of the motor M1. A control unit UC, of the micro-controller type, controls the motor M1 and therefore the transmission of drive to the belt C1.

It will also be noted that above the roller 13, as shown in figure 1, provision is made for other means (not shown) of moving tickets fed from a fourth magazine containing a strip of tickets of different width from the other strips.

Once the magnetic information has been recorded on a ticket (followed by immediate reading of the information), the strip is directed into a guide channel CG1 to a cutting station COU which includes an electromagnetic guillotine fitted with an electro-magnet EM1 with a plunger carrying the cutting part (not shown).

In practice, the strip is held taut between two rollers of dissimilar evolute. This tension facilitates separation of one ticket from the continuous stock along the aforementioned lines of weakening. In particular, this separation is effected by lowering the guillotine onto the strip thus held taut. Provision may be made for optical detection, for example, of the said lines of weakening to control the action of the guillotine.

Once cutting has been completed on the ticket concerned, the control unit UC actuates the motor M1 in the direction F2, opposite to the direction F1, in order to move the cut ticket to the thermal print station TT. Thus, having been cut and magnetically recorded/read, the ticket is directed to a guide channel CG2 separate from the feed channels CA1, CA2 and CA3.

Referring now to figures 2A to 2D. Provision is made for means of supporting the print head 24 including a flexible plate 224, forming a hinge without play, fixed on one hand to the print head 24 and on the other hand to a mount 25 supporting the block 26 arranged to rotate and positioned facing the head 24.

The block is driven in rotation by a belt 263 connected via rollers (not shown) to the shaft of the motor M2.

The arm 22 is guided in rotation about a rod 253 integral with the mount 25. The arm is capable of applying force on the head 24 and flexible plate 224 assembly via a spring 223 thereby causing the print head to tilt on the block 26.

When activated, the electro-magnet EM2 causes the arm 22 to rotate about the axis 253, by lengthwise displacement of its core, which bears on the arm 22 which, in the example shown, is retained by a return spring RR.

5 A rigid plate 221 plays the role of a backing plate fixture. At the same time, it serves to limit the degree of freedom of the mobile assembly formed by the head 24, the plate 224 and the supports 226 and 225.

10 Movement of the assembly 24, 224, 221 is obtained by the effect of the plate 221 which imparts a rolling motion to the head 24 through the linkage to the bar 222 and its seating 251.

15 Thus, when the electro-magnet EM2 is electrically activated, its core moves lengthwise and bears against the arm 22, which then pivots about the axis of rotation A2 of the rod 253, causing the thermal print head to tilt towards the block 26.

20 Rotation of the assembly formed by the head 24, the rigid plate 221 and the flexible plate 224, causes the blade 224 forming a hinge without play to bend.

25 The block 26, held about its axis of rotation A1 by the housing 254 supported on the mount 25, is thus integral with the mount, whereas the thermal print head 24 pivots relative to the mount about the axis A2. Thus, the ticket moving in the direction shown by the arrow D is clamped between the block 26 and the thermal print head 24 when the latter is in the position where it is tilted against the block 26.

30 When the thermal head 24 is applied against a first principal face of the ticket, the block 26 is applied against a second principal face of the ticket, opposite to the first face. The block 26, in rotation, exerts a tangential force, by friction, on the second face of the ticket, thereby causing the first face to move across the print head 24 in the direction of travel D.

In the example described, the first face of the ticket is coated with a material of which the colour changes irreversibly in relation to temperature. The thermal print head 24 incorporates electrically operated heating elements which release heat, by the Joule effect, capable of changing the colour of the ticket (to black for example) on its first principal face. Operation of the motor M2 driving the belt 263 to rotate the block, and the distribution of electrical current in the elements of the thermal print head 24, are controlled by the aforementioned micro-controller UC, advantageously in a coupled manner.

Reference will now be made to figure 3 to describe in greater detail the structure of the block 26.

According to the invention, the block 26 is formed by a first roller 261, which is powered, and a second roller 262, which is idle. In practice, the block incorporates a pin 264, generally cylindrical in shape, drive in rotation by the belt 263, about A1. The powered roller 261 is integral with and fixed in relation to the pin 264, while the idling roller 262 is in rotation about A1 by sliding of its inner surface on the pin 264.

In the example described, the tickets are made of paper, while the outer surfaces of rollers 261 and 262 are made in a material with a large coefficient of friction on paper. Thus, as the ticket moves in the direction D, it is subjected to a tangential force from the powered roller 261, by friction, while the idling roller 262 is caused to rotate by the force exerted on its outer surface by the moving ticket. Thus, tickets of different widths can be driven towards the thermal print head 24, according to similar sequences of movement, avoiding any direct contact of the driving roller and the print head.

In the presence of a large format ticket (wider than the width of the drive roller), the two components of the block (drive roller and idling roller) turn.

The powered segment of the block 261 drives the ticket, which in turn drives the idling roller 262.

In the presence of a small format ticket (narrower than or equal in width to that of the drive roller 261), the drive roller drives the ticket and the idling roller is immobilised on the print head.

This arrangement (powered part and idling part of the block) thus avoids contact on a prohibitive surface between the rotating block and the head.

Undue consumption of electricity as pure energy loss, caused by friction of the powered block on the head, is thus avoided. This results in a reduction (capacity, volume) of the driving means (control and power supply electronics) required for normal operation of the device according to the invention. It will be noted that, with segmentation of the block into an idling part and a powered part, abrasion of the head by particles adhering to the block is also avoided (for example magnetic oxide dust particles).

Advantageously, the block forms an angle α with the direction of travel D effectively less than 90° . It will be noted here that the angle α is an algebraic angle, between two vectors :

- a first vector moving away from the powered roller towards the idling roller, and
- a second displacement vector represented by the arrow D.

Preferably, the angle α is between 89° and 90° , for example close to 89.7° .

The aforementioned guidance means advantageously include guide tabs TG1 and TG2 to hold the ticket along the direction of travel D. The two tabs TG1 and TG2 are placed on either side of the powered roller 261 (more particularly on either side of the belt 263, as shown in figure 3).

The angle α formed by the block 26 with the direction of travel D helps to lay the tickets against the tabs TG1 and TG2, while the idling roller 262 advantageously serves to hold the ticket without presenting any resistance. Thus, one of the major advantages afforded by the present invention lies in the fact that it becomes possible to print tickets of different formats, in particular of different widths. It will be noted that the width of the tickets in this case is taken to mean their dimension in the direction perpendicular to the direction of travel D, therefore substantially along the block 26.

It will be further noted that in a simplified variant of the device according to the invention, the means of guidance of the print station TT may only include a single tab, preferably tab TG2 located downstream of the block 26 in the direction of the travel D of the ticket.

Preferably, the width of the powered roller 261 is close to that of the narrower tickets. Furthermore, the idling roller 262 is adjacent to the powered roller 261. Provision is made for a wall 266 with a small coefficient of friction and fixed to the pin 264, enabling the idling roller 262 to be held against the powered roller 261. Provision may also be made for a thin wall with a small coefficient of friction, fixed to the pin 264, between the powered roller 261 and the idling roller 262.

Reference will now be made to figure 4 to describe, in greater detail, the means of support for the thermal print head 24.

Overall, these means of support are composed of an arm 22, on the end of which the core of the electro-magnet EM2 (figure 2) is intended to bear. The arm 22, forming a lever, is integral with a frame 227 on which is mounted the head 24, via an assembly of parts 221, 224, 223, 226 and 225.

The part 225 is a spacer plate which is removable, making it possible to fit two types of thermal print head 24, of different respective thicknesses.

The part 226 is a fixing plate to which are secured the spacer plate 225 and the head 24. Thus, the fixing plate 226 is designed to be mounted in the frame 227, by means of the parts 223, 224 and 221.

5 ---Part 221 corresponds to the rigid plate shown in figure 2. It is fixed to the plate 226, without the provision of means of direct fixing to the frame 227. The bar 222 extending from said plate fits into the aperture 251 which includes a part 252 designed to be secured by the screws 255 to the mount 25 (figure 2). Thus, the rigid plate 221 is able to pivot about the axis A3,
10 substantially parallel to the direction of travel D of the tickets, making it possible to impart a degree of freedom which corresponds to a rolling clearance about the axis A3 of the thermal print head 24. In relation to the axis of rotation A2, the head 24 is substantially immobilised by means forming springs 223, and also by a flexible plate 224 fixed, on one hand, to
15 the plate 226 and, on the other hand, to the part 252 (via its apertures 227), and therefore the mount 25. The spring 223 is mounted between the fixing plate 226 and frame 227. It will be noted that compression of the spring 223 can be adjusted to a desired pressure, exerted by the head 24 on the tickets or, in practice, according to the characteristics of the tickets (thickness,
20 smoothness, etc.). Advantageously, the rigid plate 221 thus serves to eliminate undesirable pitching motion of the print head 24, while at the same time enabling it to roll about the axis A3.

As shown in figure 4, the bar 253 is inserted into seatings incorporated in the
25 arm 22 carrying the frame 227. It is fixed to the arm 22 by fixing means 256 and thus pivots, about the axis A2, relative to the mount 25 in seatings incorporated into the latter (figure 2).

Reference will now be made to figure 5 to describe the means of testing the
30 resistance heating elements R of the print head 24, which the device according to the invention advantageously includes.

In the example, the resistance elements R , substantially aligned, are supplied by a voltage V . A measuring console MES, controlled by the aforementioned control unit UC, includes a selector S operated by the console MES, and a current measuring device A connected to the measuring console MES.

The selector S is positioned on a selected heating element whose efficiency or resistance value it is desired to measure. The current consumed in the supply branch B indicates, when it is below a chosen threshold, wear or breakage of the element concerned. In practice, the selector corresponds to the addressing register for the resistance elements of the print head customarily used for printing. It will be noted however that the current passing through the resistance elements for test purposes is, in this case, less than the current used for thermal printing, which notably makes it possible to test the elements with a reduced electricity consumption.

Thus, the unit US includes a module MOD for addressing the resistance elements. In practice, this module includes an address register, each address being relative to a resistance element R_i , enabling each element to be tested separately.

Such testing makes it possible advantageously to check the precision of printing, in particular for the printing of barcodes which correspond to magnetic information carried on a magnetic stripe provided on each ticket.

Of course, the present invention is not limited to the embodiment described above by way of example; it extends to other variants.

Thus, it is to be understood that the invention also applies to the printing of tickets other than transport tickets, for example parking payment tickets, fitted with a magnetic stripe. More generally, it may be applied to the printing of tickets with or without a magnetic stripe carrying information.

In the example described above, the tickets are made of paper coated, on at least one principal surface, with a material capable of changing colour in the presence of heat. As a variant, provision may also be made for a tape which deposits a material of a selected colour on the tickets, this material being rendered adhesive by thermal treatment. In particular, when the resistance elements release heat, this material is deposited on the surface of the ticket facing the head 24. Such a tape can move across the thermal print head, for example at the same speed as the ticket. It is then seated between the head and ticket.

Furthermore, in the example described above, the powered roller and the idling roller are juxtaposed. As a variant, a gap may be provided between the two rollers, of selected thickness. Also, in the example illustrated in figure 3, the two rollers are cylindrical in shape, of similar radius, and their axes of rotation are substantially coincident. As a variant, provision may be made to mount an idling roller of different radius from the powered roller, with parallel-offset axes, in a plane substantially perpendicular to the direction of travel of the tickets D, such that their respective contact surfaces with the ticket are substantially contiguous.

Of course, the means of support for the thermal print head 24, illustrated in detail in figure 4, are described above by way of example and are capable of alternative embodiments.

Claims

1. Ticket printing device, in particular transport tickets, of the type including:

- at least one thermal print head (24),
- driving means (26, 263, M2) arranged to move a ticket across the print head, presenting a first principal face of the ticket to the print head, and
- means of guidance (CG2, TG1, TG2) capable of imparting a direction of travel (D) to the ticket,

characterised in that said driving means include a block (26) applied against a second face of the ticket, opposite to the first principal face, and including a first powered rotating roller (261) capable of causing the ticket to move, and a second idling roller (262) , extending beyond the powered roller, which is used to drive tickets of different widths in the direction of travel (D).

2. Device according to claim 1, characterised in that the powered roller (261) and the idling roller (262) are respectively generally cylindrical in shape, substantially co-axial and similar in radius, and in that the motorised roller and the idling roller are substantially juxtaposed.

3. Device according to either of claims 1 and 2, characterised in that the guidance means include, facing the motorised roller (261), at least one wall parallel to an edge of the ticket, forming a tab (TG2) capable of defining the direction of travel (D) of the ticket, while the block (26) forms a chosen angle (α) with said direction of travel (D).

4. Device according to claim 3, characterised in that the the guidance means include, along the direction of travel, an upstream tab (TG1) and a downstream tab (TG2), substantially juxtaposed and placed on either side of the powered roller (261).

5. Device according to either of claims 3 and 4, characterised in that the block (26) forms, in the direction from the powered roller (261) towards the idling roller (262) , with a direction of travel (D) of the ticket towards the

print head, an angle (α) of between 89° and 90° , preferably in the region of 89.7°

6. Device according to any of the preceding claims, characterised in that the thermal print head (24) includes a plurality of resistance heating elements (R) capable of releasing heat to enable printing of the ticket, and in that the device includes means (MES, MOD) to electrically test the resistance elements (R_{ij}), one by one, said testing means utilising an addressing module (MOD) for the resistance elements (R_{ij}).

7. Device according to any of the preceding claims, characterised in that it incorporates means of supporting the print head (24) including a flexible plate (224) fixed, on one hand, to the print head (24) and, on the other hand, to a mounting (25, 252) integral with the block (26), together with a rigid plate (221) fixed to the print head (24) and equipped with an end bar (222) substantially parallel to the direction of travel (D) and seated so as to rotate about an axis (A3) substantially parallel to this direction of travel (D) in an aperture (251) incorporated into the mounting (252), such that said rigid plate (221) is capable of preventing pitching motion of the print head (24) whilst at the same time allowing a rolling motion about said axis (A3).

8. Device according to claim 7, characterised in that it includes means of pushing ($Em2$, 22) the plate (221) against the block, the print head being in a position facing the block.

9. Device according to claim 8, characterised in that the pushing means include an electro-magnet (EM2) and are actuated electrically.

10. Device according to any of the preceding claims, characterised in that the thermal print head (24) is capable of printing barcodes on a ticket.

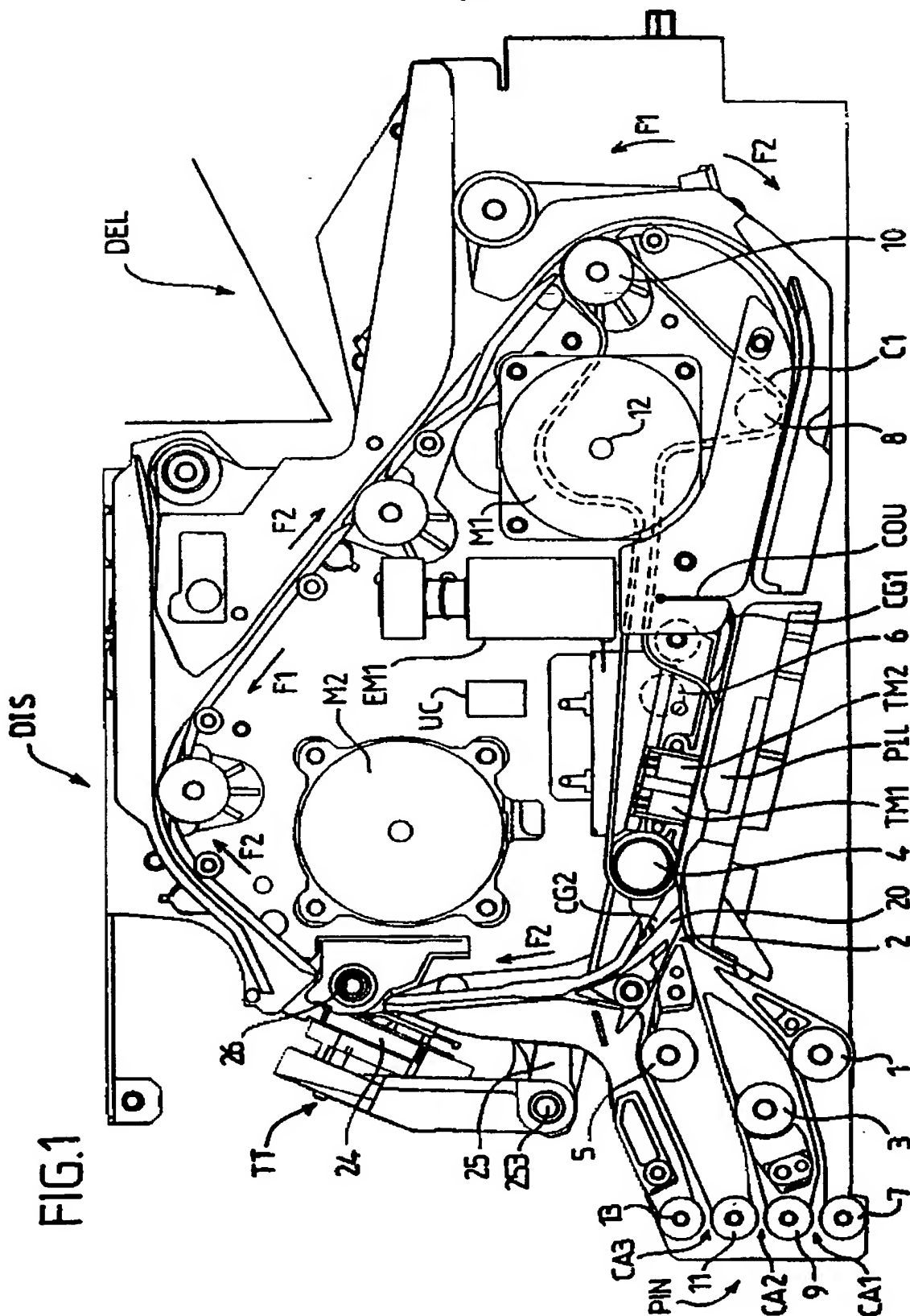
11. Device according to claim 10, characterised in that the ticket includes magnetic information, and in that the device additionally includes a magnetic recording head (PIL), while the print head (24) is arranged to operate in

conjunction with the magnetic recording station to print barcodes matching the magnetic information recorded on the ticket.

Abstract

The invention concerns a ticket printing device, provided with a thermal printing head (24) and a powered block (26), between which a ticket moves along. The invention is characterised in that the block is segmented into a power-driven part (261) and an idling part (262), for driving tickets of different widths. For tickets with width approximately the same as the length of the power-driven part (261), the idling part (262) is immobilised against the printing head (24). For the tickets with a width approximately the same as the entire length of the block (26), the idling part (262) is driven in rotation by the displacement (D) of the ticket. The invention is useful for printing transport tickets with magnetic stripes.

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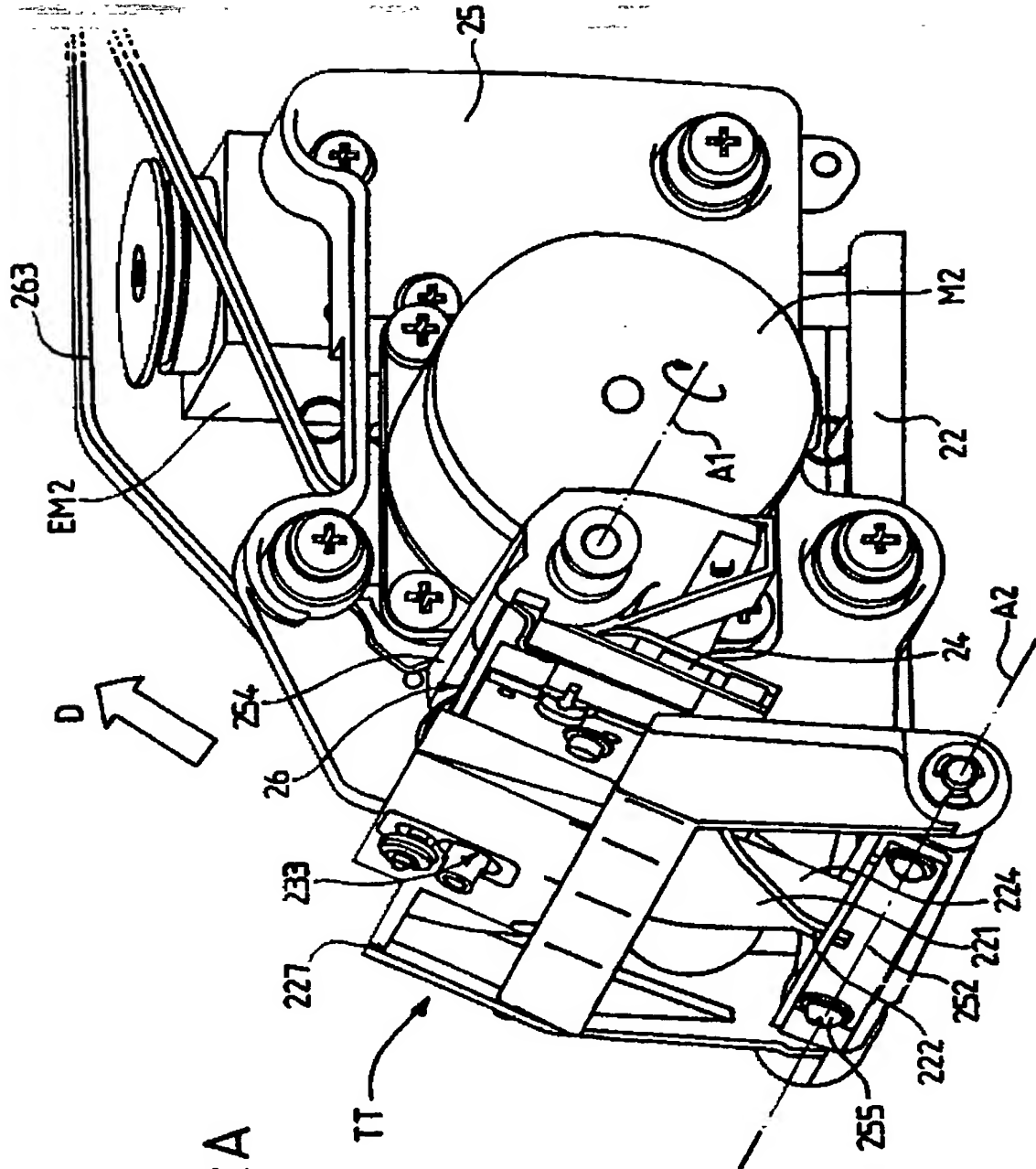
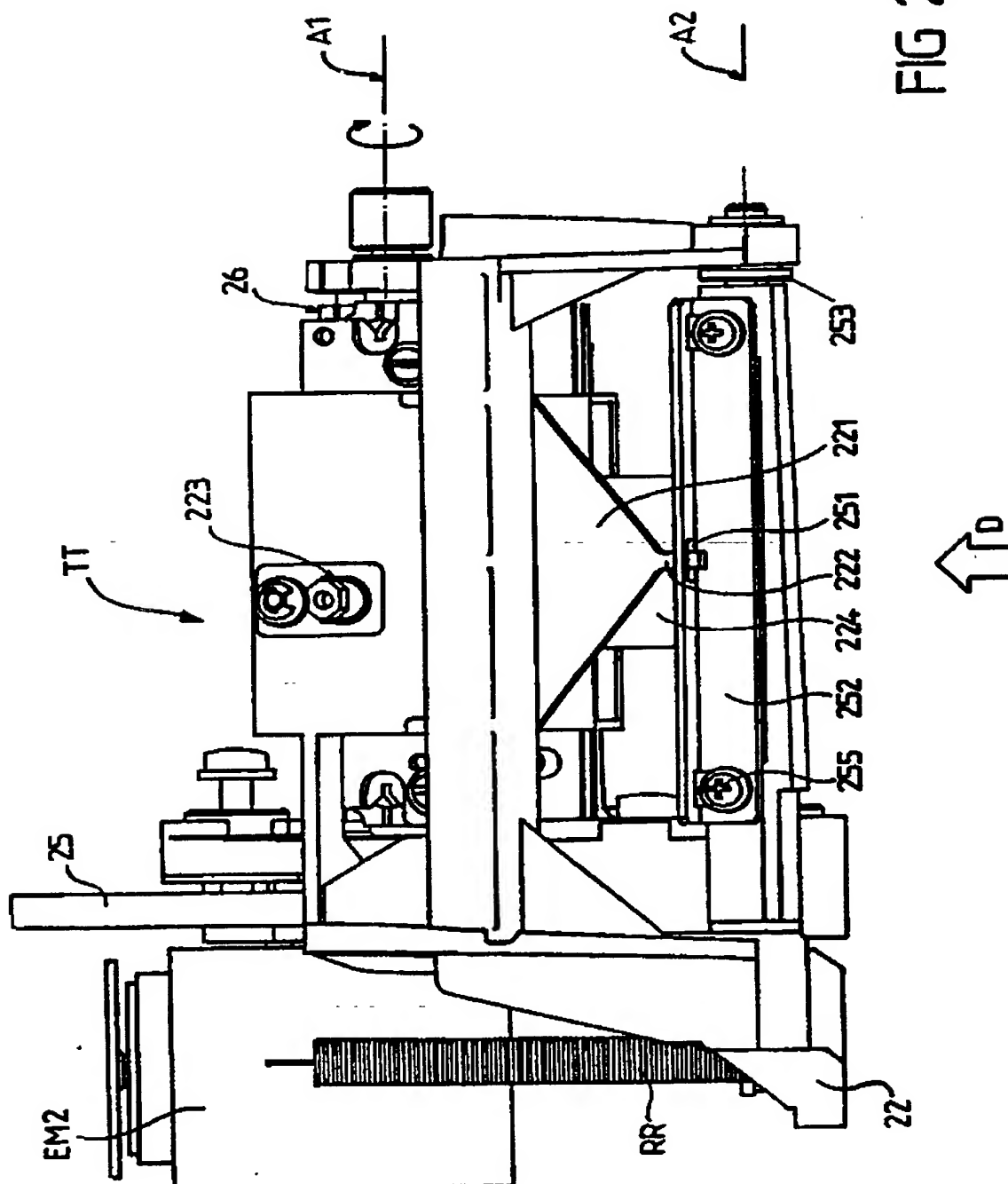


FIG. 2A



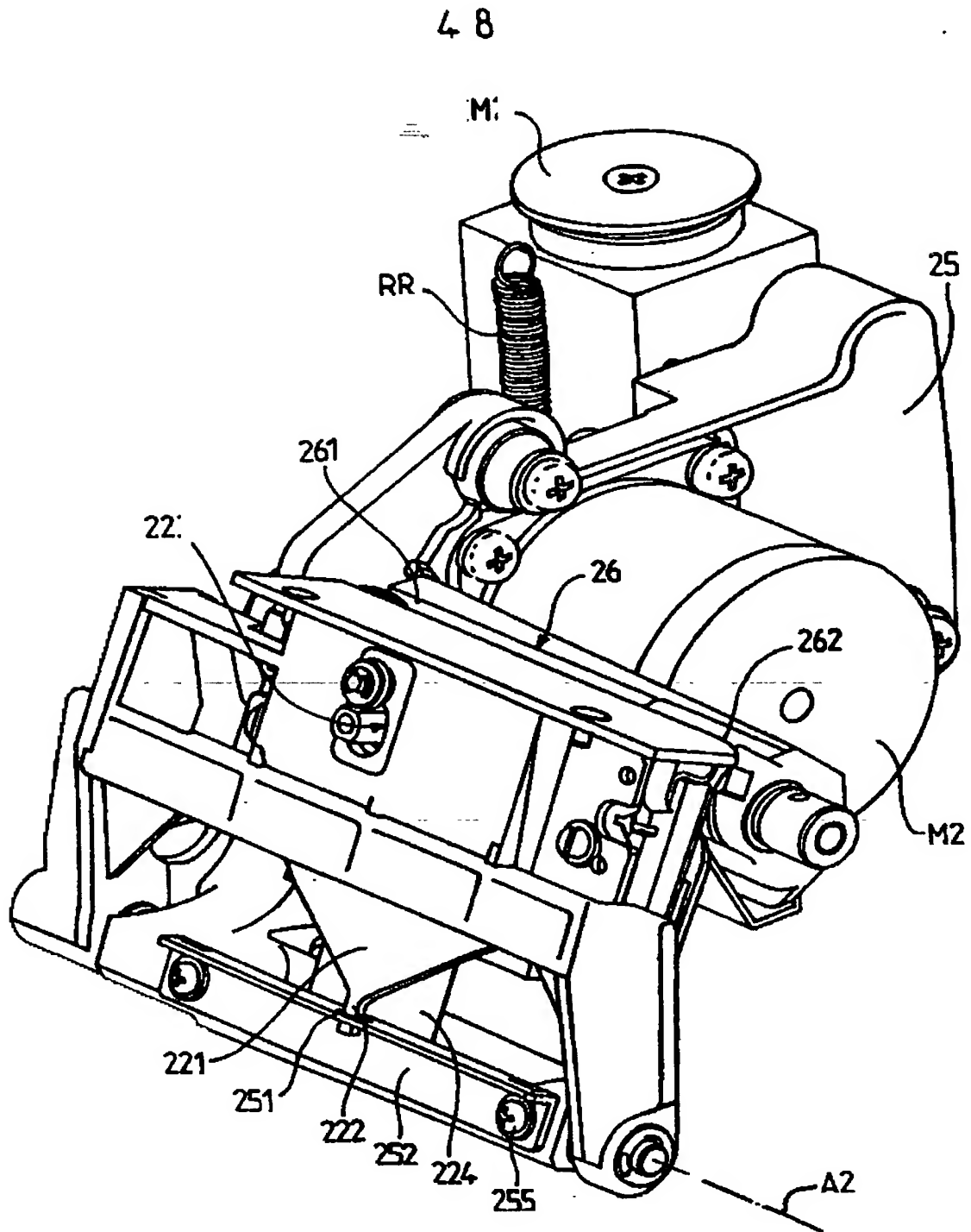
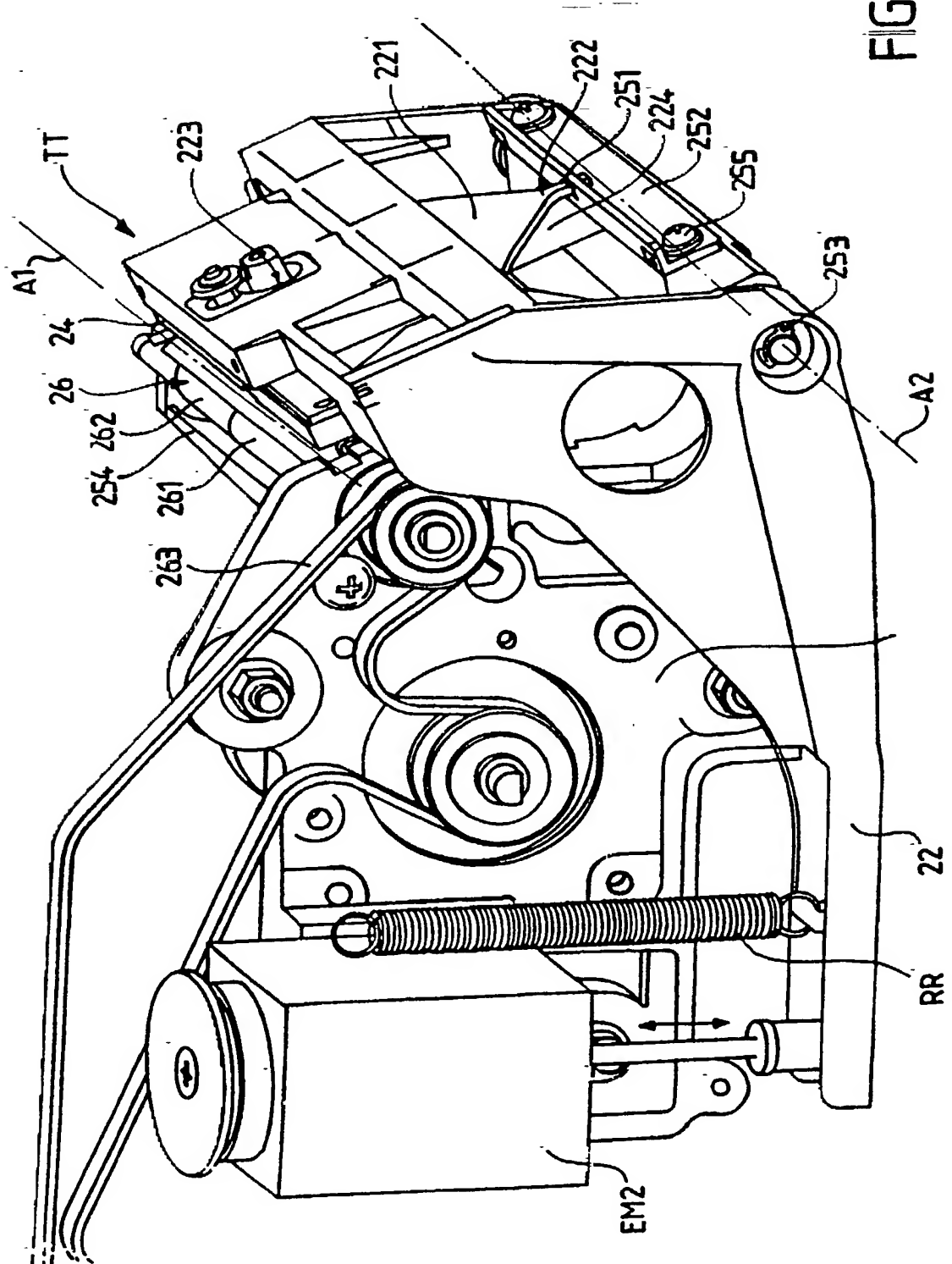


FIG 2C

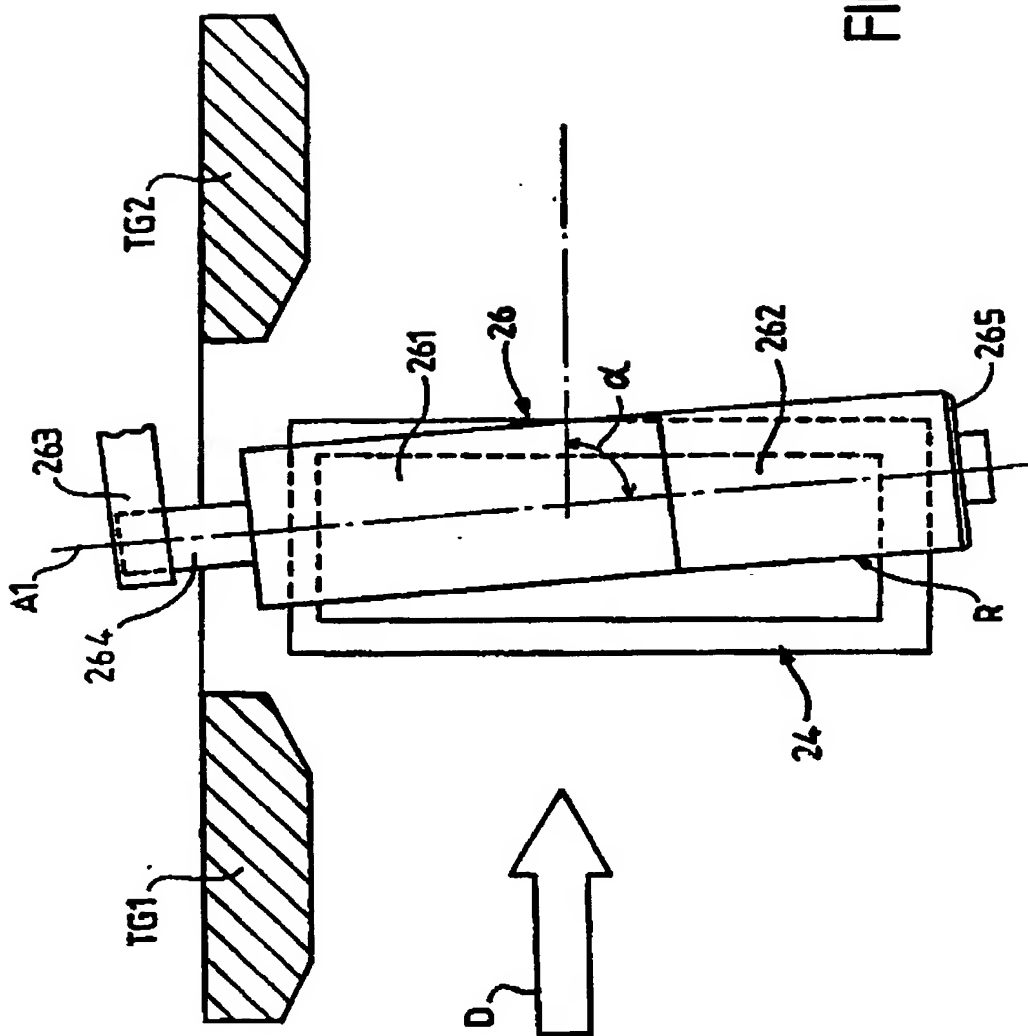
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FIG. 2D



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FIG. 3



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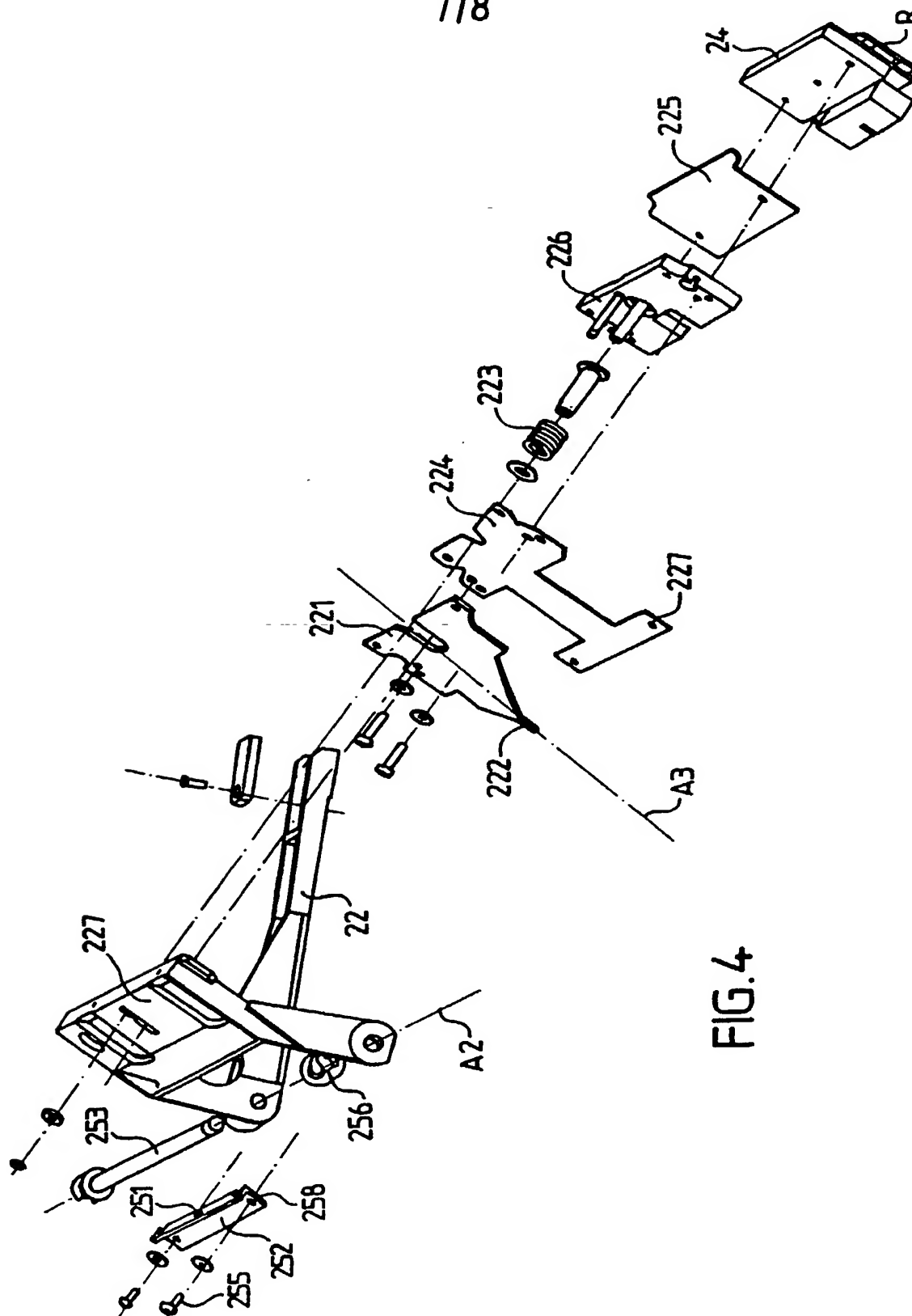


FIG. 4

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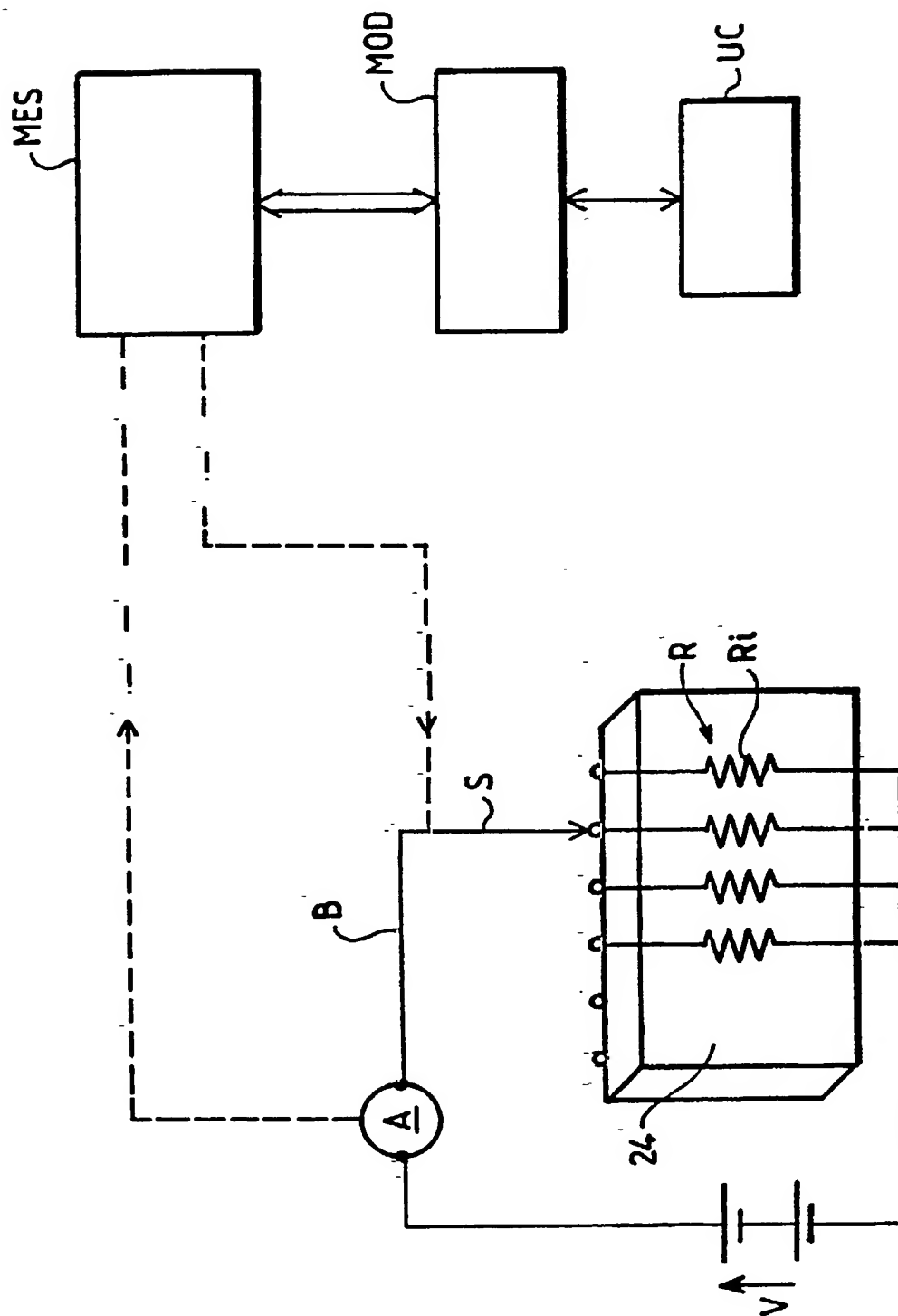


FIG. 5

Declaration and Power of Attorney for Patent Application

Déclaration et Pouvoirs pour Demande de Brevet

French Language Declaration

En tant l'inventeur nommé ci-après, je déclare par le présent acte que:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

Dispositif d'impression de titres, notamment de titres de transport, de formats différents

et dont la description est fournie ci-joint à moins

☐ ci-joint

☒ a été déposée le 17 Juin 1999

sous le numéro de demande des Etats-Unis ou le numéro de demande international PCT **/FR99/01467**

_____ et modifiée le

_____ (le cas échéant)

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1 56 du Code fédéral des réglementations

As a below named inventor, I hereby declare that.

My residence, post office address and citizenship are as stated next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

the specification of which

☐ is attached hereto

☐ was filed on _____

as United States Application Number or PCT International Application Number

_____ and was amended on

_____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1 56

French Language Declaration

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below, and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed

Prior Foreign Application(s)
Demande(s) de brevet antérieure(s) dans un autre pays

Priority claimed
Droit de priorité
revendiqué

(Number) (Country)
(Numéro) (Pays)

(Day/Month/Year Filed)
(Jour/Mois/Année de dépôt)

☐ ☐
Yes No
Oui Non

(Number) (Country)
(Numéro) (Pays)

(Day/Month/Year Filed)
(Jour/Mois/Année de dépôt)

☐ ☐
Yes No
Oui Non

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below

(Application No.)
(N° de demande)

(Filing Date)
(Date de dépôt)

(Application No.)
(N° de demande)

(Filing Date)
(Date de dépôt)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la demande antérieure et la date de dépôt de la demande nationale ou internationale PCT de la présente demande

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application

(Application No.)
(N° de demande)

(Filing Date)
(Date de dépôt)

(Status) (patented, pending, abandoned)
(Statut) (breveté, en cours d'examen, abandonné)

(Application No.)
(N° de demande)

(Filing Date)
(Date de dépôt)

(Status) (patented, pending, abandoned)
(Statut) (breveté, en cours d'examen, abandonné)

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique, et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

French Language Declaration

POUVOIRS En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec l'Office des brevets et des marques (*mentionner le nom et le numéro d'enregistrement*)

POWER OF ATTORNEY As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (*list name and*



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(703) 413-3000

Nom complete de l'unique ou premier inventeur GLIZE Jean-Pierre	Full name of sole or first inventor _____
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Nationalité FRANCAISE	Citizenship _____
Adresse Postale (Même adresse)	Post Office Address _____
<i>Jean Pierre Glize</i>	_____
Nom complete du second co-inventeur, le cas échéant	Full name of second joint inventor, if any
Signature de l'inventeur _____ Date _____	Second inventor's signature _____ Date _____
Domicile _____	Residence _____
Nationalité _____	Citizenship _____
Adresse Postale _____	Post Office Address _____
_____	_____

(Fournir les mêmes renseignements et la signature de tout co-inventeur supplémentaire)

(Supply similar information and signature for third and subsequent joint inventors)